Personal Teaching Efficacy, General Teaching Efficacy and Content Efficacy: A Comparison of First and Fifth Year Agriculture Teachers

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Abstract

The purpose of this study was to compare first and fifth year agriculture teachers' on general teaching efficacy, personal teaching efficacy, and content efficacy. Teacher efficacy has been defined as a two dimensional construct composed of personal teaching and general teaching efficacy. Personal teaching efficacy involves a teachers' evaluation of their own capability to bring about student learning. General teaching efficacy reflects the degree a teacher believes other educators can control the learning environment despite influences such as family background, IQ and school conditions (Gibson & Dembo, 1984). Content efficacy is the level of confidence an agriculture teacher possesses in agribusiness and economics, plant and soil science, animal science, agricultural mechanics and technology, and natural resources and environmental science. The sample consisted of first and fifth year agriculture teachers in Texas during the 2006-07 school year. A total of 129 first year teachers and 68 fifth year teachers were identified and 141 teachers responded yielding a 71% response rate. Personal teaching and general teaching efficacy were measured by the short form of the teacher efficacy scale (Woolfolk & Hoy, 1990). A researcher developed instrument was used to measure content efficacy.

Introduction

According to the National Research Agenda for Agricultural Education and Communication (Osborne, n.d.), research priority area 4 for Agricultural Education in Schools is to "prepare an provide an abundance of fully qualified and highly motivated agriscience educators at all levels" (p. 20). The agenda specifically calls for efforts to "identify and analyze variables that contribute to teacher success" (p. 20). This study contributes to the work of the National Research Agenda by investigating teacher efficacy during a critical period in teacher development.

Researchers have agreed teaching efficacy is complex and difficult to understand (Knobloch, 2001; Tschannen-Moran, 2000). Bandura (1997) first defined self efficacy as a belief in one's capability to execute the actions necessary to achieve a certain level of performance. Gibson and Dembo (1984) defined teacher efficacy as a multi-dimensional construct composed of two independent dimensions: personal teaching efficacy and general teaching efficacy. Personal teaching efficacy involves a teachers' evaluation of their own capability to bring about student learning. General teaching efficacy reflects the degree to which a teacher believes educators can control the learning environment despite influences such as family background, IQ and school conditions.

Self efficacy, as described by the personal and general efficacy sub-scales, fails to recognize the contribution of content efficacy to overall teacher efficacy. Knowledge in subject matter has been found to be an important characteristic of effective teachers (Roberts & Dyer, 2004). Complicating the issue of subject matter knowledge within agricultural education is the fact agriculture teachers teach a variety of subjects. Those subjects could range from plant and soil science to agricultural mechanics and beyond. Prior research has investigated perceptions of content specific knowledge to determine teachers' in-service needs. However, little work has been done to determine the role subject matter knowledge plays in teacher efficacy.

Bandura (1977) suggested efficacy is strongly influenced by experience. Much of the research on teacher efficacy has been focused either in pre-service teaching and the student teaching experience or across the entire career cycle. Little research has been done, and particularly in agricultural education, to explore differences in or changes in teaching efficacy during the early years of in-service teaching.

Huberman (1989) proposed The Teacher Career Cycle Model, describing different career stages encountered by teachers throughout their careers. The model includes the influence of personal or organizational environmental conditions upon the career development of the teacher. The initial phase of the model is described as the discovery and survival phase, which lasts from one to three years. Individuals in this stage focus upon learning how to teach, deciding what to teach, navigating through the teaching environment, learning how to manage students and self, and developing an overall sense of efficacy. Between years four and six of teaching, career teachers enter into the second phase, stabilization. In this phase, teachers commit to teaching and are less inclined to focus on other occupational ambitions. Teachers in this stage typically believe they possess greater pedagogical mastery and focus upon the educational needs of students.

Previous studies have found teacher efficacy to be stable throughout various career stages in teaching. However, these researchers have typically grouped large intervals of teaching experience together. Pigge and Marso (1993) defined early career teachers as teachers with 5 to 19 years of experience. Teachers in the middle of their career were defined as teachers with 20 to 29 year of teaching experience. Teachers late in their career were those who had thirty or more years of teaching experience. DeMesquitat and Drake (1994) broke teachers up into four groups. Group one had 1 to 8 years teaching experiences. Group two had 9 to 14 years of teaching experience. Group three consisted of teachers with 15 to 18 years of teaching experience. Group four had teachers with 19 to 37 years of teaching experiences. Broad groupings fail to detect differences among teachers in Huberman's survival phase and stabilization phase. These are critical phases for the retention of teachers. As many as 15% of new teachers leave the profession during the first or second year (Darling-Hammond, 1997). As many as half of all teachers reportedly leave by the end of their sixth year (Marso & Pigge, 1997).

There has been developing interest in investigating teacher efficacy at the pre-service and student teaching phase. Watters and Ginns (1995) found that general teaching efficacy beliefs are most likely to change when students are exposed to vicarious learning experiences or social

persuasion, such as coursework. According to Woolfolk Hoy and Hoy (1990), actual teaching experiences during the student teaching practicum have a great impact on personal teaching efficacy and general teaching efficacy. Hoy (2000) found that efficacy rose during teacher preparation, but decreased with actual teaching experiences. Roberts, Harlin, and Ricketts (2006) found teaching efficacy levels of student teachers increased during the four week classroom instruction, decreased to their lowest levels in the middle of the 11- week field experiences, and then increased to their highest levels at the end of the 11- week field experiences. Knobloch (2006) found student agriculture teachers entered their student teaching experiences already feeling efficacious, and their sense of efficacy did not change at the end of the student teaching experience. Knobloch (2001) recommended more research on the development of teaching efficacy, specifically during the "beginning years" (p 128) of teaching.

Knobloch and Whittington (2003) examined teacher efficacy related to career commitment of novice agriculture teachers. Teachers with higher career commitment were more efficacious after the first 10 weeks of school and were more likely to persist in the face of difficulties they experienced during the first 10 weeks of school. Teachers in both low and high career commitment groups had the same teacher efficacy at the first week of the school year. Glickman and Tamashiro (1983) examined efficacy, ego development, and problem solving between first year, fifth year, and former teachers. They found no significant differences on efficacy between first and fifth year teachers. Former teachers however scored lower than first and fifth year teachers in measures of efficacy and ego development.

The consequences of teacher efficacy are that greater efficacy leads to greater effort and persistence, which lead to better performance (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). Teacher performance, influenced by the performer's sense of efficacy, becomes the source of future efficacy believes. Over time this process stabilizes into an enduring set of efficacy beliefs. This raises the question of whether there is a difference in the level of personal teaching, general teaching and content efficacies due to teaching experience.

Purpose and Objectives

The purpose of this study was to compare first and fifth year agriculture teachers' on general teaching efficacy, personal teaching efficacy, and content efficacy. The objectives of this study were as follows:

1. Describe the demographic characteristics of first and fifth year Texas agriculture teachers.

2. Compare personal teaching efficacy and general teaching efficacy of first year and fifth year teachers.

3. Compare content efficacy of first year and fifth year teachers.

Methods

The population of this study was first and fifth year agriculture teachers in Texas. The accessible sample was first and fifth year agriculture teachers during the 2006 – 2007 school year. First year and fifth year agriculture teachers were selected because of their differences according to the Teacher Career Cycle Model (Huberman, 1989). According to Huberman, first year teachers are in the survival phase while fifth year teachers are in the stabilization phase. Finding from this study represent an accepting sample. Caution should be used in generalizing the findings beyond the sample studied.

A frame was developed for first and fifth year Texas agriculture teachers from the 2006-2007 membership list of the Vocational Agricultural Teachers Association of Texas. The list was thoroughly analyzed; duplicate entries and entries that did not apply to the study were deleted and other known first year and fifth year teachers were added. The target population was identified as 197 individuals; 129 first year teachers and 68 fifth year teachers.

Data were collected using an electronic questionnaire. The instrument consisted of three sections. Section one measured general teaching efficacy and personal teaching efficacy, section two measured content efficacy and section three measured demographic characteristics. For tracking purposes, participants were randomly given a three digit code. The first question on the instrument was a mandatory open-ended question asking for the individual's unique code that was provided in each email correspondence.

General teaching efficacy and personal teaching efficacy were measured using a modified version of the Teacher Efficacy Scale (Gibson & Dembo, 1984) that was used by Woolfolk and Hoy in 1990. Woolfolk and Hoy modified the original scale by only using the 16 questions that produced an adequate reliability and four more items that referred to the adequacy of the teacher's pre-service program. Participants were asked to rate their level of agreement on the 20, five-point Likert-type scale items, one being strongly disagree and five being strongly agree. This instrument contained seven items that measured general teaching efficacy and nine items that measured personal teaching efficacy. The alpha coefficients of reliability were previously reported as.77 for the personal teaching efficacy and .72 for general teaching efficacy. Post hoc reliability analysis resulted in similar reliability coefficients for first year teachers (personal teaching = .74, general teaching. = .67) and fifth year teachers (personal teaching = .71, general teaching = .75).

Section two of the instrument contained 14 researcher developed items. These 14 items were five-point Likert-type scale items used to measure technical content knowledge. The Texas certification exam in agriculture content is comprised of five domains. Each domain represents a subject area and contains technical competencies for that domain. For each of the 14 items, teachers were asked to rate their confidence in the ability to teach the technical competencies for each of the five domains in the Texas certification exam framework. Participants rated their ability on a five point scale with one being not confident and five being complete confidence. Items were developed using the Texas Education Agency Preparation Manual—Agricultural Science and Technology 6-12.

Content domains measured were: agribusiness and economics, plant and soil science, animal science, agricultural mechanics and technology, and natural recourses and environmental science. The certification exam and the competencies listed were designed by a committee of state center staff, representatives from professional educator organizations, content experts, and members of the business community (TEA, 2006). Therefore, the items used in this section of the survey were validated by the panel of teacher educators and experts in the agriculture field responsible for creating the exam. This section of the instrument was pilot tested using the 17 spring 2007, student agriculture teachers at Texas Tech University on May 7, 2007. The pilot test yielded a Cronbach's alpha of .85. After data collection, the content efficacy reliability was determined to be .93 for first year teachers and .87 for fifth year teachers. The final section of the instrument collected demographic data to describe the participants in the study. The items included age, gender, ethnicity, level of education and certification method.

Subjects were contacted via email. Participants who could not be contacted electronically were sent a letter containing an invitation to participate and the link to the survey. Data collection was conducted May 15th through June 22nd. A total of five contacts were made. The contacts included the initial invitation to participate, three thank you/follow up reminders, and a final notice. This produced 141 useable instruments for an overall response rate of 71%; 71% (n = 92) of first year teachers and 72% (n = 49) of fifth year teachers.

To control for non-response, a comparison was made between early respondents and late respondents. Typically, individuals who responded to the last stimulus would be called late respondents. Linder, Murphy, and Briers (2001) recommend to "back up" (p. 52) to use responses from multiple stimuli until a minimum of 30 late respondents is reached. To accomplish this goal, respondents who completed the instrument prior to May 30th were considered early respondents, while those who completed the instrument on or after May 30th were considered late respondents. An independent samples t-test showed no significant difference among early and late respondents for first year teachers. Fifth year teachers also showed no significant difference between early and late respondents on personal, general, and content efficacy.

Data were analyzed using SPSS. Measures of central tendency and variability were used to describe teacher characteristics. Cohen's d, a measure of effect size, was calculated to analyze the difference between first year teachers and fifth year teachers on the dependent variables. According to Fraenkel and Wallen (2003) effect size is a "technique for assessing the magnitude of a difference between the means of two groups" (p. 257).

Findings

The first objective sought to describe the demographic characteristics of first and fifth year agriculture teachers. The average age of first year teachers (n = 83) was 28 (SD = 7.35) and ranged from 21 to 56 (see Table 1). Fifth year teachers (n = 45) had a mean age of 32 (SD = 6.65) and ranged from 26 to 52.

Table 1

Age of First and Fifth Year Agriculture Teachers

Teaching Experience	Mean (*M*)	Median (*Mdn*)	Standard Deviation (*SD*)	Range
First Year (*n* =83)	27.93	25	7.35	21-56
Fifth Year (*n* = 45)	32.44	30	6.65	26-52

A summary of the remaining teacher characteristics is displayed in Table 2. Males (51%) and females (49%) were equally represented among first year teachers while fifth year teacher were represented by a majority of males (63 %).

Table 2

Summary of Demographic Characteristics for 1st and 5th Year Teachers

	1st Year Teachers (*n* = 84)		5th Year Teachers (*n* = 46)	
	f	%	*f*	%
Gender				
Male	43	51.2	29	63.0
Female	41	48.8	17	37.0
Ethnicity				
Caucasian	74	90.2	42	93.3
Hispanic	6	7.3	2	4.4
Black	1	1.2	1	2.2
Other	1	1.2	0	0.0
Education				
Bachelors Degree	66	78.6	29	63.0
Masters Degree	18	21.4	17	37.0
Certification				
Traditional	56	66.7	32	69.6
Post-baccalaureate	12	14.3	5	10.9
Emergency	10	11.9	6	13.0
Masters	6	7.1	3	6.5

With regard to ethnicity, both experience groups were found to have a strong majority of Caucasian teachers. However, first year teachers had a slightly higher percent of Hispanic teachers (7%) as compared to fifth year teachers (4%). A bachelor's degree was the highest level of education reported for the majority for first (79%) and fifth year teachers (63%). The remainder of the first (21%) and fifth (37%) year teachers reported having a master's degree. Traditionally certified teachers made up 67% of first year teachers and 70% of fifth year teachers. The remaining 33% of first year teachers and 30% of fifth year teachers acquired teaching credentials by an alternative certification method.

Objective two sought to compare personal teaching efficacy and general teaching efficacy of first year and fifth year teachers (see Table 3). The mean score for personal teaching efficacy of first year teachers was 3.60 (*SD* = .62). General teaching efficacy was rated lower by first year teachers with a mean score of 3.01 (*SD* = .67). Consistent with the first year teachers, the fifth year teachers rated personal teaching efficacy higher than general teaching efficacy. However, the fifth year group had higher mean scores on both personal teaching efficacy (*M* = 3.70) and general teaching efficacy (*M* = 3.08). Effect sizes were calculated to assess the magnitude of the difference between the two groups. The value of Cohen's *d* for personal teaching efficacy was .18 and for general teaching efficacy was .10. In both cases the size of the effect is considered small (Field, 2005).

Table 3

A Comparison of First Year and Fifth Year Teachers on Personal Teaching Efficacy and General Teaching Efficacy

	1st Year Teachers (*n* = 84)		5th Year Teachers (*n* = 46)			
Characteristic	*M*	*SD*	*M*	*SD*	*Effect Size*	*Cohen's Index*
Personal Teaching Efficacy	3.60	.62	3.70	.45	.18	Small
General Teaching Efficacy	3.01	.67	3.08	.67	.10	Small

[b]1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree

The third objective sought to compare content efficacy of first year and fifth year teachers (see Table 4). The mean for first year teachers on overall content efficacy was 3.74 (*SD* = .67). Additionally, content efficacy was broken down into five technical domains. First year teachers were most confident in animal science (*M* = 4.24, *SD* =.80), followed by agricultural business and economics with a mean of 3.70 (*SD* = .79). Plant and soil science (*M* = 3.63, *SD* = .71), environmental science (*M* = 3.62, *SD* = .89), and agricultural mechanics and technology (*M* = 3.48, *SD* = .93) were the subjects first year teachers were least confident in performing.

Table 4

A Comparison of First Year and Fifth Year Teachers on Overall Content Efficacy and Content Efficacy by Domain

	1st Year Teachers (n = 84)		5th Year Teachers (n = 46)			
Characteristic	*M*	*SD*	*M*	*SD*	*Effect*	*Cohen's Index*
Overall Content Efficacy	3.74	.62	3.87	.45	.24	Small
Animal Science	4.24	.80	4.34	.58	.14	Small
Ag Business & Economics	3.70	.79	3.84	.56	.20	Small
Plant & Soil Science	3.63	.71	3.71	.48	.13	Small
Environmental Science	3.62	.89	3.70	.64	.10	Small
Ag Mechanics & Technology	3.48	.93	3.77	.72	.35	Medium

1 = not confident, 2 = slightly confident, 3 = somewhat confident, 4 = confident, 5 = very confident

The mean for overall content efficacy for fifth year teachers was 3.87 (*SD* = .45). Similar to first year teachers, the fifth year teachers were most confident in animal science (*M* = 4.34, *SD* = .58) and agricultural business and economics (*M* = 3.84, *SD* = 56). Fifth year teachers were least confident in agricultural mechanics (*M* = 3.77, *SD* = .72), plant and soil science (*M* = 3.71), and environmental science (*M* = 3.70, *SD* = .64). Effect sizes were calculated to assess the magnitude of the differences between the two groups on content domains. Cohen's *d* values ranged from .10 to .35. The effect size for agricultural mechanics and technology was medium. All other effect sizes were small.

Conclusions/Recommendations/Implications

Kantrovich (2007) reported that nationally males outnumbered females 3:1 among secondary agriculture teachers. Males also outnumbered females among the fifth year teachers in this study, although by a smaller margin. About two-thirds of the fifth year teachers were male. First year teachers, however, were more balanced in gender with 51.2 % of the sample being male. This gender equity is similar to other findings of first year teachers in Texas. Burris and Keller (2007) found 53% of first year agriculture teachers in 2006 were male. These findings indicate a trend shift in gender distribution. It is apparent that agricultural education has arrived at a balance between genders. It is not clear if this equal distribution will be stable over time or

if the trend will continue toward larger percentages of female teachers. The gender distribution of new teachers should be continually monitored.

Burris and Keller (2007) reported 19% of first year teachers in 2006 had earned a master's degree. This study found a higher percentage of first year teachers (27%) having a master's degree. Additionally, 37% of fifth year teachers reported having a master's degree. This discrepancy between groups could possibly reflect a higher retention of teachers with a master's degree. Likewise, the difference may reflect the outcome of continued education by those who earned there masters degree during those first five years of teaching.

Camp, Broyles, and Skelton (2002) reported that 13% of agriculture teachers nationally were certified by methods other than an undergraduate degree in agricultural education. This study found a higher number of teachers being certified by some means other than a traditional undergraduate degree in agricultural education. Alternative certification methods accounted for 33% of first year teachers and 30% of fifth year teachers. This utilization of alternative certification methods may provide some additional explanation for the discrepancy in level of education as some choose to certify post-baccalaureate.

The purpose of this study was to compare first and fifth year agriculture teachers on general teaching efficacy, personal teaching efficacy, and content efficacy. For both groups, personal teaching efficacy was perceived to be higher than general teaching efficacy. Teachers tended to be more confident in their own skills to bring about student learning than in the ability of teachers in general to bring about change. Fifth year teachers had a higher sense of personal teaching efficacy and general teaching efficacy than first year teachers, although the effect of experience was small. The results of this study provide further evidence that efficacy beliefs are stable even among teachers at different career stages (DeMesquitat & Drake, 1994; Pigge & Marso, 1993).

This does raise questions as to the relationship between teacher efficacy and career commitment. What role does teacher efficacy play in decisions to leave the profession? In addition, it would be valuable to look at first and fifth year teachers' efficacies throughout the school year instead of just at the end of the year. Perhaps the reason the effect was small was because the first year teachers were surveyed at the end of their first year of teaching and have already reached a saturation point of the successes and failures that compose an individuals efficacy beliefs. Practitioners should continue to focus on building and maintaining efficacy beliefs during the pre-service stage.

Similar patterns existed in the findings of content efficacy, with fifth year teachers having a higher sense of efficacy on each of the content domains as well as overall content efficacy. Again, effects were small with the exception of agricultural mechanics and technology (medium). The order of their confidence in the domains differed. First year teachers were more confident in animal science, agribusiness and economics, plant and soil sciences, environmental sciences, followed by agricultural mechanics. Fifth year teachers were more confident in animal science, agribusiness and economics, agricultural mechanics and technology, plant and soil science, followed by environmental sciences.

Several studies have found differences among beginning and experienced teachers in-service needs, however, those studies have found that technical agricultural knowledge and skill competencies were ranked lower in priority when compared to competencies in the areas of instruction, program planning, development and evaluations, and program administration (Garton & Chung, 1997; Layfield & Dobbins, 2000).

Possible variables in determining an individual's technical content efficacy could be the institution and technical agriculture coursework completed. The agricultural institutions in Texas have various course requirements. It is recommended that future research should consider this variable. Additionally, the number of teachers in a program may have an impact on specific content efficacy. Teachers in multi-teacher programs may have flexibility to be more focused, whereas teachers in single teacher programs may be required to exhibit competence in multiple content areas.

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